

to any but the first boat; the first prepares the second; the second the third; and so on, to any number of boats.

The same operation, in all its parts, is performed in an ascending or alternate trade; with this addition, that water is drawn into the tub, to create a sufficient power to raise the loaded boats.

It now comes to speak of the expedition produced by this system.

First, It must be evident to every one, particularly those who have seen any similar operation, that if an alternate movement was adopted, and a boat was to come up the same plane where one went down, the boat could not be raised on the bridge of the plane while the other was passing, because it would occupy the situation where the ascending boat must pass; neither could the descending boat draw the ascending into the upper canal; the descending boat losing its power in touching the lower canal; consequently the ascending boat would not pass through more space than the descending, therefore a stop would take place below the bridge of the plane, as is now the case; but it is the descent of the second boat which draws the first over the bridge, into the upper canal, and raises a second boat into the place of the first; this second is also drawn in by the third descending boat, and so on, which is the consequent result of a rotatory movement, which rotatory movement could not be applied if any kind of cradle, or carriage, was used to convey the boat, as such carriage must necessarily rise, and descend, on the same plane, and consequently give an alternate movement. Hence the necessity of wheels to the boats, or of rollers to the plane.

Secondly,

Secondly, The centrifugal fans regulating the movement, and the cast-off hook discharging the boats from the chains, is a great means of saving time, and, in fact, leaves little more for the men to do than hook boats to the chains, in succession, they rising, and descending, in regular rotation, which admits of such extraordinary speed, that two four-ton boats may pass a plane, whose perpendicular is 200 feet, in three minutes, as will appear by the following statement:

	Minutes.
Hooking the preparer to the boat, - - - - -	0 $\frac{1}{2}$
Hooking the boat to the leading chains, - - - - -	0 $\frac{1}{2}$
Drawing water into the tub, if necessary, - - - - -	0 $\frac{1}{2}$
During this the man below has sufficient time to hook his boat.	
Passing the plane, - - - - -	1 $\frac{1}{2}$
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During the passing of the plane, the man above, having nothing else to do, may be getting his line of boats forward to the situation for the preparer, or pull forward those boats which have ascended; or this might be the work of a boy, at 1s. 6d. per day. Hence 1920 tons may be performed in twelve hours; and, if this is not sufficient, there can be no difficulty in working such a machine by night, changing the sets of men, who might live in the building over the machine; and thus, 3840 tons may be performed in twenty-four hours, at one plane, which, I hope, is adequate to the greatest canal trade which the most sanguine imagination can conceive; particularly when it is considered, that there is no canal yet known, where 1000 tons per day throughout the year passes at one point of the canal: on a canal sixty miles long, for instance, 5000 tons might move on its various

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parts,